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Title: Asking the right questions and getting meaningful responses: 12 tips on developing and administering a questionnaire survey for healthcare professionals

Short title: Developing a questionnaire survey

Introduction

Questionnaires have been widely used in medical education (McColl et al 2001, Edwards et al 2002). They allow responsive research to changes in policy and the working environment, from populations of trainees and educators which may be geographically and demographically disparate, and can also provide a useful snapshot of opinions over a short space of time.

This paper is aimed at the novice or occasional researcher who has identified a potential area of research, and is considering using a questionnaire survey. Questionnaires can provide a 'quick and dirty' method of data collection, providing data of short term use for minimal effort, but with a little care results can be made more valid, intelligible, and ultimately useful. The process of developing and executing a questionnaire study is straightforward, but pitfalls which may damage the end results can be avoided with forewarning. As with any project, preparation is everything.

The following twelve tips highlight some of the key hurdles to conducting a survey within a healthcare environment, which should guide the inexperienced researcher through the development of a questionnaire survey to the production of useful results from a sample of busy and inundated health professionals. Key pieces of jargon which are unavoidable in discussing questionnaires are defined in the glossary.

Each tip is illustrated with a real life example from the development of two questionnaires – one for trainees and one for their educational supervisors. These were commissioned by the General Medical Council to evaluate the impact of their publication *The New Doctor* (GMC 2005) on the experience of the first postgraduate training year in the UK (Foundation Year 1).

These tips assume you are developing an ad hoc questionnaire tool for a specific purpose, rather than using an existing, validated tool. However, even if you are using something 'off the shelf', you should still consider these steps, as not all tools will readily transfer to a new setting.

Tip 1: Define your research question early.

Summarising what you want your questionnaire to answer, in one simple sentence, is important for clarifying what the research is intended to do and avoiding ‘project creep’. Be clear about what you want to find out and what you will do with the findings. Apply the ‘so what?’ test: who will be interested in your results – including you?

Real-life example

Working to a brief (‘evaluate the impact of [the GMC document] *The New Doctor*’) defined the scope of the project, but an actual question still needed to be refined. The focus was placed on identifying whether the content of *The New Doctor* was appropriate for trainees at the level of Foundation Year 1, rather than identifying the extent to which *The New Doctor* was being adhered to (which would constitute more a quality assurance/quality management question [Smith 1992]), and framed in simple terms as ‘The New Doctor: Are we doing the right things?’.

This simple framing of the purpose of the project subsequently provided a touchstone by which to maintain focus. This was particularly important given the involvement of ten staff in two organisations across three sites.

Tip 2: Define your population and establish how you will identify your sample.

In defining your research question you should begin to identify the population you are interested in – this could range from the national population of all trainee doctors, to the staff of a single ward or department. If more than one group is involved, for example medical and nursing staff, consider whether you will be asking them the same questions, or if different versions will be needed.

You then need to establish what sort of sample you need – with a small population (say up to 100 people) you can target 100% of that population, but to optimise resources with a larger number you should consider a sampling strategy. This may be random, or purposive, or stratified to ensure proportional representation of particular professional or demographic groups. You will also

need to identify the gatekeepers of access to your sample – who has the contact details you require, and how will you obtain that information? If you need to identify a sample, you will need access to a full record of the population and any stratifying variables. There may be data protection issues which mean gatekeepers cannot release this information to you – be prepared to revise your strategy.

Real-life example

The populations initially identified for our study were Foundation Year 1 trainees (F1s) and their educational supervisors in three areas of the UK – Scotland, London, and the North of England. However, it emerged that a wider, national population of F1s could be included as the GMC was able to provide a database of nearly all potential F1s in the UK. For educational supervisors no such resource existed, and they were identified by direct contact with local education administrators in the three areas.

In Scotland, a 50% random sample was taken from the F1 population, stratified by Deanery to ensure representation of smaller regions. In the rest of the UK, a random 20% sample was taken. These sampling strategies were responsive to local considerations and opportunities, while maintaining focus on the wider national interest.

Tip 3: Plan your schedule.

To ensure your project is on course, you need to have markers to alert you when it veers *off* course. Identify what tasks are involved, how long each will take, and be clear what the milestones are. Be realistic, and be prepared to revise what you can do as circumstances change.

Identify how your survey will be delivered, as this will affect timescales.

Traditional paper questionnaires are still widely used, but electronic delivery is growing in popularity. This can provide more direct contact, produce quicker results and save resources, but consider whether you will have access to valid email or postal addresses, and whether you have the resources to develop and

manage an electronic system against the cost of postal delivery (and return postage).

Real-life example

Our project had a specified delivery date to work back from. The experience of the research team informed realistic estimates of the time analysis and writing up would take, which indicated a latest possible date to have a completed data-set. Calculating the time for distribution and return of questionnaires, including reminders, meant we had a deadline for completion of a final version of the questionnaire.

At the same time, access to the target populations (trainees and their educational supervisors) was considered. As there was no readily available database of email addresses, a postal questionnaire was planned (see Tip 8).

Tip 4: Manage research governance early

Research governance encompasses ethical approval, monitoring and record keeping, and protects the interests of researchers and participants (e.g. Department of Health 2005). Governance requirements vary between countries, and while ethical requirements are usually defined by legislation, details of approvals should be clarified with hosting organisations.

Not all projects will require ethical approval, but it is safer to assume that it is required until explicitly confirmed otherwise. Key ethical considerations include procedures for informed consent (completion of a questionnaire represents tacit consent) and the protection of respondent confidentiality. The process provides a useful rigour in clarifying a proposal but can be time consuming, and you should account for this in your planning.

Guidance on ethical requirements in different countries may be obtained from central agencies:

- **UK: National Research Ethics Service (www.nres.npsa.nhs.uk)**
- **USA: Office for Human Research Protections (www.hhs.gov/ohrp)**

- **Canada: Interagency Advisory Panel on Research Ethics**
(www.pre.ethics.gc.ca)
- **Australia: National Health and Medical Research Council**
(www.nhmrc.gov.au/ethics)
- **Europe: www.privereal.org provides a portal for European information**

Real-life example

Due to the anticipated short deadlines identified during the bid process, ethical approval for our questionnaire development was gained prior to commencing the project, saving a great deal of time during the actual research process. The variability in NHS Trust R&D requirements was demonstrated in some Trusts requiring a full submission of all information submitted to the ethics committee, while others did not require anything beyond being informed the project was underway.

Tip 5: Get guidance from the target population at an early stage.

You will probably be able to generate the core questionnaire items simply by identifying your research question and examining relevant literature. However, it is important to address *face validity* and *content validity* at the earliest opportunity. This means having questions which are understandable and relevant to the target population.

Even if you are an expert on the area, it is important to get the views of others on the important questions to ask. The best way to ensure this is to speak to the people who will be completing the questionnaire, to gain their views on the areas of importance.

Real-life example

As well as a close review of *The New Doctor* and existing questionnaires aimed at the target populations, the process of generating items for our questionnaires began with a series of 12 focus groups with trainees and educators across the UK. Participants were asked to write down their own initial answers to specific questions about the

Foundation Programme experience before discussing them to identify priorities (Delbecq & van de Ven 1971).

Once a list of issues was compiled for both trainee and supervisor questionnaires, further focus groups were conducted to validate and prioritise these issues. These were then mapped back onto *The New Doctor* as another check of content validity, before moving on to initial drafting of the questionnaire.

Tip 6: Think about your analysis, and take expert advice.

Think early on about what you will do with the results from your questionnaire.

This will influence how you present the questions – will you use all numerical scales, or will some questions be better answered in free text or multiple response formats?

You should also consider analysis. Questionnaire data is usually numerical, so statistical analysis will be appropriate. However, the extent to which analyses are meaningful depends in large part on the sample size – for some analyses such as the comparison of groups within your population, the sample size must be large enough to provide sufficient statistical power (Cohen 1992). On the other hand very large samples will produce statistically significant results from a very small actual difference in scores, and care must be taken not to read too much into such results.

By seeking expert advice on statistical issues at an early stage, the analysis and interpretation of results can be greatly hastened, and with greater assurance of their usefulness. Skipping on this stage of preparation can lead to at best a great deal of recoding and time-consuming analysis, at worst a useless dataset which cannot answer your research question or be presented as evidence to conferences and journals.

Real-life example

We decided in initial drafting that rating scales would be an appropriate means of capturing opinions on the range of elements covered in *The New Doctor*. They are

commonly used, and so easily understood by respondents. Textual anchors were varied following discussion (using both 'agree-disagree' and 'contributed nothing-greatly' ranges), to ensure that questions flowed naturally, and potentially maintain respondents' attention. A seven-point scale was chosen to provide greater sensitivity, as people may not use the extremities of a scale (effectively reducing it by two).

A statistical expert advised that given the nature of the scales, and the expectation of skewed responses, analysis on the basis of frequency distributions would be more informative than looking at the mean responses. The large sample sizes meant comparison of means would produce statistically significant differences which may not be informative.

Tip 7: Validate drafts with your target population.

Once you have a full first draft, go back to the target population, and ensure they are reading the questions as you intended. A 'talk through', in which people think aloud as they answer the questions, can be a good way of establishing this. You can listen for hesitation (questions which take re-reading may be skipped over by the respondent), and ask questions to probe potential ambiguities. This process can improve construct and response validity, ensuring the questions are interpreted as meaning what is intended. Although initial draft development can be 'top down' and driven by the requirements of the project, this phase of pre-testing must be 'bottom up', driven by the responses of the people who will have to complete the questionnaire.

Real-life example

Once a first draft was completed and reviewed by the research team, members of the target populations were approached to give feedback on the draft in a mixture of talk-throughs with individuals, small groups working through the questionnaire, and individual completion by email. All these individuals were also asked to complete a short feedback sheet concerning clarity, relevance etc.

The majority of feedback concerned interpretation of the 'stem' for the first block of questions. This went through several subtle rewordings, from "*How useful to your*

development as a doctor have the following been during your first foundation year?”

to “How important have the following been to your development as a new doctor?”.

The factors which appeared to influence interpretation were words such as ‘important’ and ‘useful’, and the length of the stem – people will attempt to complete a questionnaire as quickly as possible, and may skim long sentences.

This phase led to the scale being reduced from seven points to five, following feedback that the seven point scale looked cluttered, and the observation that the full scale was being used by the majority of pre-pilot respondents.

This developmental testing stage was invaluable for validating the final draft, with several drafts being reviewed in an iterative process.

Tip 8: ‘Sell’ to your respondents.

Your respondents will not rush to complete the questionnaire. The way it is presented to them can influence their decision to complete it. Design is important, as is the information you provide. Your questionnaire will need a covering letter which should clearly state the purpose of the study, and the confidentiality of responses. It can be useful if this is signed by someone in a position of authority, to give weight to the questionnaire and if possible convey a sense that results will be listened to and influence future practice. A separate participant information sheet may also be included, but the covering letter can contain all the required information.

Real-life example

The covering letter enclosed with our questionnaires was on GMC headed paper and signed by a senior member of the GMC committee which had commissioned the research. The importance of receiving feedback to influence policy was stressed, along with the confidentiality of individual responses. A deadline was also given to encourage prompt returns. Pre-testing respondents indicated that GMC branding suggested that their comments would have a potential effect on policy, rather than simply being abstract research.

Tip 9: Pilot with a small group and test out analysis.

Once you are happy with your questionnaire and have pre-tested it with a small number of people, a larger scale pilot study can be useful for final tests of procedural feasibility and data quality. Sampling and distribution strategies reflecting those of the final study can be used to identify any issues in the completion and return of questionnaires. If you have the resources, and your final sample will be large enough, you can conduct analyses on validity and reliability on this dataset.

Real-life example

The advantages of a well-resourced study meant that we could pilot with a large sample, allowing full data analysis, including reliability and validity, to be conducted on the pilot data.

Tip 10: Monitor returns and prepare follow-ups.

If you have sampled appropriately, the usefulness (and publishability) of your data will depend on your response rate. No questionnaire will get a high response rate on a single distribution, and reminders should be planned for. To target reminders only at people who have not responded, a coded identification is necessary. While this may be seen by some as a potential breach of anonymity, the alternative – sending multiple reminders to people who have returned questionnaires – can be more detrimental to your dataset, to say nothing of goodwill (you may wish to target the same population again). Reminders can raise a response rate by up to 10%.

In general, a response rate of 80% will be considered acceptable, but more often one of over 60% may be considered a realistic goal. You can infer nothing about the profile of non-responders' opinions, although by looking at the profile of responses against the sample, if is possible to identify response biases in terms of, for example, gender or age.

Real-life example

All questionnaires had a unique identifier linked in a secure spreadsheet to a name and address. A reminder letter was sent two weeks after the initial distribution, and a second reminder with a copy of the questionnaire sent two weeks after that.

Reminders were sent only to those who had not returned the questionnaire.

Response rates of 55% of trainees, and 72% of supervisors were obtained in this way.

Tip 11: Ensure validity.

By following the above steps, you can be fairly confident that your questionnaire has face, content and construct validity. You can confirm validity if your pilot sample is large enough (although a smaller sample can still illustrate trends):

- **Questions which are not completed by a high proportion of respondents may be meaningless or unintelligible to respondents.**
- **Factor analysis can identify whether questions which relate to similar areas are eliciting similar responses.**
- **If there is a separate measure – an exam or test for example – which relates to what you are measuring, then concurrent or consequential validity may be tested.**

Real-life example

Our pilot data identified no questions with low completion rates. Factor analysis also indicated that related questions were being answered similarly, regardless of their location on the questionnaire, reinforcing construct validity. In this case there were no possible examinations of concurrent or consequential validity.

Tip 12: Ensure reliability.

The appropriate test of reliability will depend on your data. The main approaches are test-retest reliability, where the questionnaire is completed by the same individuals after an interval of a week or two, to ensure consistency

over time, and internal consistency, if multiple items are intended to reflect a single construct. If multiple ratings of a single event or individual are of interest, inter-rater reliability may be examined, or a generalisability study carried out. These, however, are unlikely to be appropriate to the majority of single-use questionnaires.

Real-life example

In this case, test-retest reliability was the only indicator it was appropriate to assess. This was carried out by sending a second questionnaire to the first 150 respondents of each sample (with the incentive of a £10 book token). Around 100 responses for each were received, and sufficient reliability was inferred from the low number of people whose responses changed by more than one scale point on more than one question. A sample of those who had changed their responses was contacted by telephone, and in the majority of cases contacted, there had been a discrete event to change their opinion. This was not a threat to reliability, and in fact reinforced validity by indicating the tool was responsive to actual changes in opinion.

Conclusion

Questionnaires are a powerful tool in the researcher's repertoire, and can provide useful and timely data with a minimum of intrusiveness for both participants and researchers. However, to ensure the quality of data, and the optimal use of resources, care must be taken to plan the study carefully, from the programme of work, through the development of questionnaire content and pre-testing with the target population, to the analysis of data. Preparing for these stages well in advance will help ensure that the findings of your study are robust and valid, for dissemination to colleagues and to the research community.

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